VOTING IS AN ACT OF FAITH
e-collections: e-voting's little brother

Søren Stauning
Danish Ministry for Economic Affairs and the Interior
Brought to you by…

Søren Stauning
Danish Ministry for Economic Affairs and the Interior (MA political science)

• Project manager: collection system
• Election technology
• Election security
• Election research
• International electoral cooperation

Experience coming from e-government
Agenda

Definitions & main arguments
Comparison e-voting vs. e-collection (generic)

e-Collection: The Danish Case
  - Principles & legislation
  - Implementation
  - Sneak peeks

Conclusion
Argument 1)

Collection systems are akin to e-voting systems
Should consider the same characteristics and recommendations:
• (a degree of) Verifiability
• (a degree of) Coercion-resistant design
• (a degree of) Secure implementation
• (a degree of) Secrecy
Argument 2)

E-collection systems are good test cases

- Border case between clear-cut e-voting systems and generic e-government systems
- An e-collection is less crucial than an e-election
- Can the vendor landscape deliver?
- Is the government e-ready?
- Think big, start small
Definition: e-voting systems

The hardware, software and processes which allow voters to vote by electronic means in an election or referendum

(Rec(2017)5)

- CoE CAHVE meeting in Strasbourg Oct 2015 scoped e-collections out, voting management systems in.
Definition: e-Collection systems

Digital systems that aid the collection of endorsements from voters to either
A) recognize parties as legal entities, and/or
B) to endorse them to appear on the ballot and/or
C) to endorse candidates to run for office.
# E-voting vs. E-collections

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>E-voting</th>
<th>E-collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal political information</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Requirement: Secure</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Requirement: Integrity</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Requirement: Verifiability</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Requirement: coercion free</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Time critical</td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td>Turnout</td>
<td>Backbone of democracy; 70-90 % of electorate</td>
<td>Fringe; 1-2 % of electorate</td>
</tr>
<tr>
<td>Pivotal to democracy</td>
<td>V</td>
<td>-</td>
</tr>
</tbody>
</table>
The Danish case
The Danish political system, 1

5,5 M inhabitants
4,2 M parliamentary voters

Parliamentarism
Proportional representation
179 seats in parliament

98 municipalities

Since 1973 min. 8 parties in parliament
Tradition for minority governments

2 % minimum threshold
Often tight elections
The Danish political system, 2

Constitutional secrecy of the vote ➔ Controlled environment voting only

Voting rights require citizenship AND residency

National register produces voting list

Paper & pencil: All national elections can be held in candle light

Mandatory recount

Requirement to stand for parliamentary elections:
  20,000 unique signatures ~ 0.5 % of votes
Collecting signatures, old procedure

1: contacts

2: paper form w/ sign. & pers. ID no.

3: eligibility check

4: paper form

5: paper form

6: 20,000 signatures
Endorsements: a barrier to political participation built too high?

Cost for parties in old procedure
• Financial barrier ~ 30 KEUR + work load ~ a man year

Process time for parties in old procedure
• Weeks to months from initial support to approved endorsement
• Endorsement expiry date 18 months

Purpose of new system (Online self-service web portal)
• Make the difficult process a little more easy. But not too easy. Just… difficult in an easy way.
• Promote parties with strong public backing rather than parties with a strong organisation
• Simplify & save money

E-collection launced as a substitute for e-voting!
• (and we’re so happy we didn’t go there)
**Time line**

2012  2013  2014  2015  2016  2017

- Political ambition
- Pol. deal
- Law
- Tender
- Development
- Bill
- Preparation works: BC, use cases, budget, process description, etc.
- Contract
- Production ➔
- Production ver. 2 ➔

You are here:
System traits

4 year contract, 2x1 year extension option

Open source (GNU public license): government owns source code

User tested before (mock-ups) and after development

”Recall & repeat endorsement” functionality introduced: coercion countermeasure

Paper trail possible for accessibility purposes

Receipt in plain text sent to personal official encrypted mailbox

(Procedural:) Results published monthly

11.10.2017  KV17
Old procedure

1: contacts

2: paper form

5: paper form

4: paper form

Municipality

3: voting rights check, paper form

6: 20,000 physical signatures

Voter

Party
New procedure
New procedure

(0: contacts)

1: email address (a “support”)

2: enters email address

4: Log in, approve (an “endorsement”)

3: Invitation email (+1 w) (valid 4 w)

5: 20,000 signatures

Voter

Party

 ministry for economic affairs and the interior
Checks and balances
Secrecy vs. accountability, verifiability and transparency

Voter

Party
Who has access to what when?

- Has endorsed?
- Has withdrawn?
- Voter’s email addr. /number
- No. of endorsements
- Log of party users’ actions
- Party users
- Identity of all endorsers
- System parameters

Who has access to what when?

Voter

Party

Voter

Party

System parameters

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?

Voter

Party

Identity of all endorsers

Log of party users’ actions

No. of endorsements

Has endorsed?

Has withdrawn?
Model Overview

Client Browser

HTML
CSS
JavaScript
AngularJS

DVE Application Server

Apache Web Server
Apache Tomcat
Java
Spring

Logpoint

DVE Database Server

MySQL
Linux

Technology Stack - Production System
Deployment View

- System Owner
- Party User
- Voter

Client Browser

GUI System owner
GUI Party
GUI Voter

HTTPS / JSON

DVE Application Server
Onboarding issues

Severe system instability
Endorsers were not able to log into the system
Usability bad to the point of outright errors
Considerable security vulnerabilities
Fixing bugs produced new bugs or revived old ones
Integration of existing data into the new digital endorsement database turned out to be challenging to the point of impossible.

→ negative effect on the public's trust
- In the government’s handling of collections
- In voting issues in general?
- In the legitimacy of new parties?
## Security upgrade

<table>
<thead>
<tr>
<th>Analyseværktøj</th>
<th>DVE-1 Resultat</th>
<th>DVE-2 resultat</th>
</tr>
</thead>
<tbody>
<tr>
<td>securityheaders.io</td>
<td>D</td>
<td>A</td>
</tr>
<tr>
<td><a href="http://www.ssllabs.com">www.ssllabs.com</a></td>
<td>C</td>
<td>A+</td>
</tr>
<tr>
<td>upguard.com</td>
<td>798 af 950</td>
<td>931 af 950</td>
</tr>
<tr>
<td>observatory.mozilla.org</td>
<td>C</td>
<td>A+</td>
</tr>
</tbody>
</table>
Collections as a power funnel: Parties securing support … EMB securing representation (time of launch)

9 incumbents
Collections as a power funnel: Parties securing support … EMB securing representation (time of launch)

- Party registration: 100
- Registering in system: 50
- Activated collection: 25
- Approval to stand: 10
- Party in Parliament: 9
- Government: 3
- Leading gov't party: 1

9 incumbents
Collections as a power funnel: Parties securing support … EMB securing representation (today)
For at få punktopstilling på teksten, brug 'Forøg listeniveau'.

For at få venstrestillet tekst uden punktopstilling, brug 'Formindsk listeniveau'.

Ændring af tekst i sidefod:
1. Vælg 'Indsæt' i topmenuen
2. Vælg 'Sidehoved og Sidefod'
3. Skriv titel på præsentation ind i tekstfeltet
4. Tryk 'Anvend på alle'

27.10.2017

E-vote ID 2017: E-collection and e-voting

... what’s wrong with this picture?

Endorsements / party

Nye Borgerlige
Kristendemokraterne
Danskeres Parti
Jorden Frihed Kundskab
Ny-grundlov.dk
Dyrevelfærdspartiet
MedBorgerPartiet
Klima-Demokraterne
Fiems kidspartiet
Ny Vision
Schillerpartiet
Tespartiet
FolkesRet
Lilla
Menneske Samfundet
Republikanerne
Broderpartiet
MedborgerligFried
Haandværkerpartiet
Unplugged
DPD - Dyrenes Parti Danmark
Menneske Samfundet
Republikanerne
Broderpartiet
MedborgerligFried
Haandværkerpartiet
Unplugged
Danmarks Anarkistiske Parti
Etisk Forum
Impierepartiet
Krydset
Lukrativet
Neldemokratiet
Salomonisk parti
Bajer memes II
Dansk Centrum
Dansk Vikinge Parti
De Kristne
Decentralen
Medicinsk Cannabis
Rationalistisk Parti
Skandinavisk Parti

ministry for economic affairs and the interior
For at få punktopstilling på teksten, brug 'Forøg listeniveau'.

For at få venstrestillet tekst uden punktopstilling, brug 'Formindsk listeniveau'.

Ændring af tekst i sidefod:
1. Vælg 'Indsæt' i topmenuen
2. Vælg 'Sidehoved og Sidefod'
3. Skriv titel på præsentation ind i tekstfeltet
4. Tryk 'Anvend på alle'

Endorsements / party, log scale

27.10.2017  32  E-vote ID 2017: E-collection and e-voting

ministry for economic affairs and the interior
### Endorsements / party

#### Distribution of endorsements per party

<table>
<thead>
<tr>
<th>Week 40, 2017</th>
<th>Only parties w/ min. 1 endorsement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean average</strong></td>
<td>1.102</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>4</td>
</tr>
<tr>
<td>&gt; 10,000:</td>
<td>2</td>
</tr>
<tr>
<td>1,000 - 10,000:</td>
<td>3</td>
</tr>
<tr>
<td>100 - 1,000:</td>
<td>6</td>
</tr>
<tr>
<td>10 - 100:</td>
<td>9</td>
</tr>
<tr>
<td>1 - 10:</td>
<td>25</td>
</tr>
</tbody>
</table>

**27.10.2017**

---

**E-vote ID 2017:** E-collection and e-voting

**ministry for economic affairs and the interior**
How many parties are collecting right now? (past 5 weeks)

- 73 parties (45%) collecting with 0 supports
- 75 parties (46%) collecting with 1-10 supports
- 14 parties (9%) collecting with 10-100 supports
- 3 parties (2%) collecting with 100-1.000 supports
- 2 parties (1%) collecting with >1.000 supports

Color codes:
- Green: (Not applied to use system)
- Brown: 0 supports
- Orange: 10-100 supports
- Red: 100-1.000 supports
- Blue: >1.000 supports
Lessons learned

What we did right:

A clear goal
Funds allocated
Top level commitment
Immature organisation → small scope project

What caused trouble:

Time pressure + legal division → insufficient technical scrutiny
Software quality
Real environment testing lacking
Conclusion

E-collecting is akin to e-voting

… and is a good ”practice project” to gain maturity before ‘real’ e-voting.
Questions?
Contact

Søren Stauning
Danish Ministry for Economic Affairs and the Interior

sst@oim.dk
+45 72 28 25 23